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ABSTRACT

This guide is intended as a source book of policies, ideas, and suggestions for use by Manitoba division and school administrators responsibilities for planning, implementing, and monitoring courses in industrial arts, home economics, and vocational-industrial education. Presented in Section 1 is background on the development of vocational-technical education in Manitoba at the secondary level. Sections 2-7 discuss the following: unit-credit titles (technology education in the areas of vocational-industrial, industrial arts, and home economics); funding (categorical grant support for programs and unit-credits, replacement allocations, capital requests, and regulations); articulation (within schools, between schools, with colleges, with the apprenticeship branch, and with the workplace); programs (approval process, closures and alterations process, and unit-credits for programs); related academics; integrated concepts (employability skills, sustainable development, entrepreneurship, technology, and special needs programming). Listed in Section 8 are 10 documents that are considered important resources for technology education. (MN)

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Technology Education Guidelines

1993

- Vocational Industrial
- Industrial Arts
- Home Economics

ED 365 807

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FOREWORD

These guidelines have been prepared as a source book of policies, ideas, and suggestions. It has been written as a ready reference for division and school administrators responsible for the planning, implementation, and monitoring of courses in Industrial Arts, Home Economics, and Vocational Industrial.

The guidelines have been divided into several sections. While each section deals with a specific area, it is recommended that several sections be reviewed when planning program changes, implementation strategies, articulation arrangements, and budget projections.

Updates to these guidelines will be provided from time to time by way of page inserts.

Acknowledgement is extended to the contributors who developed these guidelines. Input is appreciated from the major stakeholders serving on the Technology Education Steering Committee, the Vocational Administrators' Ad Hoc Committee, and the High School Review process.

The thoughtful ideas and suggestions of Clyde Perry, (Consultant), Gene Happychuk and Milt Reimer (Consultants to the Technology and Science Team) formed the basis for cross-checking the appropriateness of these guidelines.

Special thanks to Edna Lee, Curriculum Services Branch, for the design and data entry of this document.

H. Marshall Draper, Coordinator
Technology and Science Team

SECTION 1 BACKGROUND

The development of vocational technical education in the province, at the secondary school level, has its genesis in an Industrial Arts concept originally expressed in "St. John's Technical," "Dauphin Collegiate Technical Institute," and "Kelvin Technical." All these schools had large shop components.

"Manual Arts", or Industrial Arts training, was considered as an integral part of the junior high system since the inception of junior high schools. But, the province has moved far beyond the Industrial Arts model at the Secondary School level. With the construction of Technical Vocational High School (1949), R.B. Russell (1967), and the subsequent development of Regional Comprehensive Secondary Schools (see the MacFarlane Commission Report of 1959) throughout the province from 1967 onward, the province has moved into a secondary vocational training system from which it is very difficult to retreat. In fact, it is a system so well established, that the recent review process has worked hard to rationalize the secondary mandate for training with an eye to setting generous limits to the mandate, liberalizing the local autonomy as requested, and providing a funding system to enhance greater utilization of our excellent and well placed facilities.

The proliferation of courses over the past 20 years carried alarming financial implications for the future. More importantly, this proliferation began to have less foundation in demonstrable need. This was probably attributable to a growing distance between the schools and valid articulation with the private sector. The concept of "regionalization," by virtue of the comprehensive schools, had evaporated. Funding systems were a disincentive to the shared use of facilities. More and more school divisions sought vocational facilities on a par with those regional schools located in and governed by neighbouring school divisions. The "comprehensive" concept was not clearly implemented by all the regional comprehensive schools. As a result, a variety of competing and ill coordinated training programs have developed in these areas. Articulation with colleges and the Apprenticeship Branch (Department of Labour) was never rationalized.

For some time there has been an expressed need for the coordination of secondary school and college programs. Existing instances of articulation are ad hoc, and not necessarily available to all schools in the province.

The 1992 rationalization of Technology Education (Vocational Industrial, and relationships to Industrial Arts and Home Economics) is based upon the following submissions, research, proposals, and reports:

- Vocational Education Follow-Up Study (1981) Province of Manitoba.
- Vocational Administrators' Brief to the Premier, and Minister of Education (1985).
- Vocational Administrators' Brief to the High School Review process (1987).
- The Report of the Skills Training Advisory Committee (1990).
- Answering the Challenge - Strategies for Success in Manitoba High Schools 1990.
- Creating a Framework for the Future, Education Legislation for the 1990's - A Consultation Paper (1991).
- Building a Solid Foundation for Our Future, A Strategic Plan 1991-96 (1991).
- Work Education Guidelines (1991).
- The Education Finance Review (1991).
- The High School Model - Curriculum Services Branch (Regional Meetings March 9-13, 1992).
- Implementation of the High School Review - A Resource for Administrators and Teachers (June, 1992).

The Technology Education Guidelines are, for the most part, based upon the principles outlined in the 1990 document "Answering the Challenge." The concept of a **generic mandate** represents the foundation for changes:

1. the **High School Program Model**, and the **Vocational Education Program Model** are virtually the same for Senior 1 and Senior 2.
2. all secondary pupils are required to take six **compulsory core credits**, and two complementary credits in Senior 1 and Senior 2.
3. introductory credit courses within clusters of vocational programs are identified as **transferable** between the programs within the cluster.
4. specified credit courses in Industrial Arts and Home Economics are identified as **equivalent** to specified Vocational Industrial credit courses.
5. credit courses within a given program should be useful for a wide range of vocational opportunities.

The program model(s), which set the framework for structuring the credit courses and programs, are outlined on the next page.

NEW HIGH SCHOOL PROGRAM MODEL

REGULAR OR VOCATIONAL HIGH SCHOOL PROGRAM	
Senior 1	**Senior 2**
Compulsory (6 credits)	Compulsory (6 credits)
Language Arts 2 credits	Language Arts 1 credit
Social Studies 1 credit	Skills for Independent Living 1 credit
Mathematics 1 credit	Social Studies 1 credit
Science 1 credit	Mathematics 1 credit
*Physical Education 1 credit	Science 1 credit
	*Physical Education 1 credit
Complementary (2 credits) made up of 1 credit or 1/2 credit courses from areas such as: • Vocational & Applied Arts Courses** • Aesthetics • Modern Languages	Complementary (2 credits) made up of 1 credit or 1/2 credit courses from areas such as: • Vocational & Applied Arts Courses** • Aesthetics • Modern Languages
8 credits	8 credits

REGULAR HIGH SCHOOL PROGRAM	
Senior 3	**Senior 4**
Compulsory (4 1/2 credits)	Compulsory (4 credits)
Language Arts 1 credit	Language Arts 2 credits
Social Studies 1 credit	Sr. 4 Courses 2 credits
Mathematics 1 credit	
Science 1 credit	
Physical Education 1/2 credit	
Electives (min. of 1 1/2 credits)	Electives (min. of 2 credits)
6-8 credits	6-8 credits

VOCATIONAL EDUCATION PROGRAM MODEL	
Senior 3	**Senior 4**
Compulsory (3 credits)	Compulsory (1 credit)
***Language Arts 1 credit	***Language Arts 1 credit
***Mathematics 1 credit	Vocational Education 4 credits (including two Senior 4 level Vocational Education courses)
***Science 1 credit	
Vocational Education 4 credits	
0 or 1 additional option	0-3 additional options
7-8 credits	5-8 credits

* Includes Fitness, Health, AIDS and Chemical Abuse

** Includes Home Economics, Vocational and Industrial Arts

*** Senior 3 and 4 Language Arts/Mathematics/Science courses may have a focus on the applied use of the content in each subject area.

NOTE: A minimum of 28 credits are required for graduation from high school

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SECTION 2 UNIT-CREDIT TITLES

The 1991 funding review resulted in the decision to change the categorial grants for vocational programs from a program focus to a unit-credit focus. This decision required that unit-credit titles be identified for all of the programming delivered under the general areas of Vocational Industrial, Industrial Arts, and Home Economics.

For those curricula developed and approved by Manitoba Education and Training, committees of teachers were called together, and unit-credit titles were identified. For those curricula developed at the school, but approved by Manitoba Education and Training, the teachers who delivered their special programs submitted unit-credit titles.

To meet the needs of students who wish to maximize their Technology Education electives in Senior 1 and Senior 2, half-credits have been identified for those levels.

The numbering system to be used for Technology Education unit-credits will show the designation as follows:

- Vocational Industrial unit-credits will be designated as **Specialized** (S). This indicates that learning experiences and appropriate skills lead to further studies at the post-secondary level.
- Industrial Arts unit-credits will be designated as **General** (G). This indicates general education experiences for all students.
- for all unit-credits, the **Modified** (M) designation will be used to indicate courses for which the curriculum has been modified to take into account the capabilities of students with special needs.
- the designation of **Applied** (V) refers to English Language Arts, Mathematics, and Science courses designed specifically to apply to Technology Education (Vocational) programs. The numbering system uses a three-character, alpha-numeric code. The first number represents the targeted senior year for which the course was developed. The second number identifies the source and credit value of the course development. The third (alpha) character identifies the course designation.

Examples:

- **Intro to Electronics 10S** (Senior I, Department developed or approved for one credit, Specialized).
- **Introduction to H.I. Tech 15S** (Senior 1, Department developed or approved for one-half credit, Specialized).
- **Family Studies 25G** (Senior 2, Department developed or approved for one-half credit, General).
- **Machine Tool Technology 30G** (Senior 3, Department developed or approved for one credit, General).

TECHNOLOGY EDUCATION (Vocational Industrial)

The "UNIT-CREDIT TITLES UNDER PROGRAM HEADINGS, DIRECTORY" is divided into three clusters of titles.

- Heavy Industrial (H.I.) encompasses those unit-credits which deal with heavy trades (indentured and non-indentured), and skills which require somewhat similar tools, usually outdoor working conditions, and similar processes.
- Light Industrial (L.I.) refers to those unit-credits which deal with light trades and occupations (indentured and non-indentured), and skills which require similar working conditions such as an in-door environment, paper or computer oriented medium, and finer motor skills.
- Human Services (H.S.) includes those indentured and non-indentured trades and occupations which deal with the service sector, human condition, and people-oriented skills.

To determine the appropriate unit-credit title to be used in an approved program, the "UNIT-CREDIT TITLES UNDER PROGRAM HEADINGS, DIRECTORY" will contain a complete listing of approved unit-credit titles. Also shown are the Department code numbers for registering and reporting student marks.

TECHNOLOGY EDUCATION (Industrial Arts)

The secondary level curriculum for Industrial Arts was originally prepared for grades 10 through 12. With the new high school program embracing grades 9 through 12, it was decided that the Industrial Arts 101, 201, 301 curriculum would be re-designated as Senior 1, 2, and 3 respectively. Half credit versions of the Senior 1 and Senior 2 curriculum have been identified for those schools that wish to provide half-credits in the complementary offerings. New course titles have been identified for the Industrial Arts unit-credits.

The Senior 4 curriculum is yet to be developed. Seniors 1 to 3 will undergo minor amendments to reflect a Seniors 1 to 4 approach.

Details concerning the Technology Education (Industrial Arts) unit-credits, numbering, department codes, and titles may be found at the back of the "UNIT-CREDIT TITLES UNDER PROGRAM HEADINGS, DIRECTORY."

TECHNOLOGY EDUCATION (Home Economics)

Home Economics for secondary level programming includes curriculum which was originally prepared for grades 9 through to 12. Now, the Home Economics 9-12 curriculum is designated Senior 1 to Senior 4 respectively. Half-credit versions of the Senior 1 and Senior 2 curriculum have been identified for those schools that prefer to provide half-credits in the complementary offerings. The original titles have been retained under the new program and designations.

Details concerning the Technology Education (Home Economics) unit-credits, numbering, department codes, and titles may be found at the back of the "UNIT-CREDIT TITLES UNDER PROGRAM HEADINGS, DIRECTORY."

SECTION 3 FUNDING

Regulations, policies, and practices regarding funding are managed by the Schools Finance Branch and/or the Public Schools Finance Board. The following are brief descriptors of funding issues that are directly related to Technology Education.

Program Support, Categorial Grant

A categorial grant of $5,000.00 is payable for **approved** Technology Education (vocational) "programs" which meet the following criteria:

1. vocationally certified teacher
   - Vocational Industrial (Special) Certificate
   - Professional Certificate (with a major in the appropriate specialty)
   - Business Education (Special) Certificate;
2. advisory committee from industry;
3. job-market feasibility;
4. work education component;
5. approved unit-credit titles;
6. minimum of 8 unit-credits, to a maximum of 16 unit-credits;
7. generic training mandate;
8. appropriate for the secondary-level mandate;
9. compatible with existing programs and facilities;
10. adequate enrollments;
11. availability for all students;
12. flexible scheduling;
13. adequate facilities to deliver the program.

Unit-Credit Support, Categorial Grant

Unit-credit categorial grants for Technology Education (Vocational Industrial) are payable **only whereas they are approved within the approval process for "programs."** Unit-credit categorial grants for Technology Education (Industrial Arts and/or Home Economics) are payable whereas they are **approved in conjunction with approved facilities or programs.**

There are two categories of unit-credit grants. **Category I** contains those Technology Education unit-credit titles under program headings which were planned, approved, and have a record of relatively higher costs based on pupil-teacher ratios, and operational costs for supplies and general overhead. **Category II** contains the remainder of those unit-credit titles under program headings which have a record of relatively lower costs, and include all Cooperative Vocational Education programs, Home Economics, and more efficient Vocational Industrial and Industrial Arts titles. A unit-credit title borrowed from any other program heading assumes the categorial funding value of the unit-credits within the allowed program to which it is being added.

Unit-credit titles may only be claimed in conjunction with an approved program.

For claiming unit-credit and program categorial grants, the following form(s) should list the program, teacher data, eligible pupils, and school data, and will be submitted by the school divisions. Completed forms will be submitted to the **Schools Finance Branch** for payment.

Manitoba

Education and Training

TECHNOLOGY EDUCATION
APPROVED PROGRAM SUPPORT
September 30, 1992

SCHOOL DIVISION: SAMPLE SCHOOL DIVISION NO. 124

SCHOOL NAME: SAMPLE SECONDARY SCHOOL

An approved program means a vocational program approved for support by the Minister.
A vocational program means an approved series of courses, consisting of eight to sixteen technology education courses intended to prepare a pupil for work, and may include vocational industrial, industrial arts, home economics and business education courses in secondary grades.

	PROGRAM TITLE	NAME OF TEACHER	CERTIFICATE (Vocational, special status certificates)	FOR DEPT. USE ONLY
1.	COSMETOLOGY	J. Doe	Voc Spec (Cosmetology)	
2.	BUSINESS EDUCATION	Wm. Riches	Prof. (Bus Major)	
3.	(Introduction to Keyboarding 15G)			
4.	(Advanced Keyboarding 25G)			
5.	(Accounting Principles 30G)			
6.	(Accounting Systems 40S)			
7.	(Automated Office 40S)			
8.	(Economics 40G)			
9.	(Law 40G)			
10.	(Seminar in Business 40S)			
11.	(Word Processing 30G)			
12.	(Software Applications 40S)			
13.				
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38.				
39.				
40.				

LIST THE NAME OF THE TEACHER WHO PRESIDES OVER THE PROGRAM.

PROVIDE THE TEACHER CREDENTIAL REQUIRED BY THE PROGRAM (REFER TO PAGE 7 OF THIS TEXT)

SHOW THE "PROGRAM" TITLES USED IN THE SCHOOL, AND REGISTERED IN PREVIOUS REPORTS.

(IF BUSINESS EDUCATION IS BEING CLAIMED, SHOW THE APPROVED CREDITS WHICH MAKE UP THE PROGRAM)

FOR DEPARTMENT USE ONLY
APPROVED:
DATE:

We hereby certify that to the best of our knowledge and belief the information furnished in this report is true and correct, and in accordance with the laws and regulations of the Province of Manitoba.

DATE _____ SECRETARY - TREASURER _____

DATE _____ SUPERINTENDENT _____

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Manitoba

Education and Training

SEMESTERED ☐

NON-SEMESTERED ☐

TECHNOLOGY EDUCATION
UNIT - CREDIT SUPPORT
September 30, 1992

SCHOOL DIVISION: SAMPLE SCHOOL DIVISION NO. 124

SCHOOL NAME: SAMPLE COMPREHENSIVE HIGH SCHOOL

	NAME OF COURSE (UNIT - CREDIT TITLE)	COURSE NUMBER	NUMBER OF PUPILS CATEGORY I	NUMBER OF PUPILS CATEGORY II	FOR DEPT. USE ONLY
1.	COSMETOLOGY				
2.	Intro to Cosmetology	10S	18		
3.	Beauty Basics	20S	18		
4.	Hairstyling and Beauty Services	20S	18		
5.	Permanent Waving	30S	18		
6.	Haircutting	30S	20		
7.	Hair Coloring	30S	8		
8.	Hair Lightening and Toning	30S	8		
9.	Salon Services	30S	10		
10.	Development and Proficiency	40S	10		
11.	Certificate Preparation	40S	8		
12.	Applied Hair Styling	40S	10		
13.	Employability Skills	40S	10		
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.	Family Studies	15G		39	
25.	Home Economics	20G		16	
26.					
27.					
28.					
29.	Intro to Graphics Technology	10G	16		
30.	Intro to Drafting Design Technology	15G		36	
31.					
32.					
33.					
34.					
35.					
36.					
37.					
38.					
39.					
40.					

- SHOW PROGRAM TITLE
  - LIST UNIT-CREDIT TITLES FROM UNIT-CREDIT TITLES UNDER PROGRAM HEADINGS, DIRECTORY

- LIST COURSE NUMBERS (NOT DEPT. CODES)

SHOW THE TOTAL NUMBER OF PUPILS REGISTERED IN EACH CATEGORY ASSIGNED TO THE APPROVED PROGRAM

FOR DEPARTMENT USE ONLY
APPROVED:
DATE:

We hereby certify that to the best of our knowledge and belief the information furnished in this report is true and correct, and in accordance with the laws and regulations of the Province of Manitoba.

DATE _____ PRINCIPAL _____

DATE _____ SECRETARY - TREASURER _____

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Manitoba

Education and Training
Schools Finance Branch

TECHNOLOGY EDUCATION
PUPIL ENROLLMENT
September 30, 1992

SEMESTERED ☐
NON - SEMESTERED ☐

SCHOOL DIVISION: SAMPLE SCHOOL DIVISION NO. 124

SCHOOL NAME: SAMPLE SECONDARY SCHOOL

Please list in alphabetical order all technology education pupils ONCE ONLY and the number of Category I and II courses. The total number of courses listed must reconcile with the total number of pupils reported on the Unit-Credit Support form. The number of courses reported on this form will be adjusted for non-supportable pupils.

	PUPIL NAME (LIST PUPILS ONCE ONLY)		GRADE / LEVEL	NUMBER OF COURSES		FOR DEPT. USE ONLY
	LAST NAME	FIRST NAME		CATEGORY I ($100)	CATEGORY II ($50)	
1.	Anderson	John	12	2		
2.	Brown	Jason	12		2	
3.	Donnelly	Maria	12		1	
4.	Haller	Sally	11	1		
5.						
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LIST PUPILS REGISTERED IN CATEGORY I AND CATEGORY II COURSES ONCE ONLY IN ALPHABETICAL ORDER

LIST THE NUMBER OF COURSES THAT EACH PUPIL IS REGISTERED IN.

FOR DEPARTMENT USE ONLY
APPROVED:
DATE:

We hereby certify that to the best of our knowledge and belief the information furnished in this report is true and correct, and in accordance with the laws and regulations of the the Province of Manitoba.

DATE _____ PRINCIPAL _____

DATE _____ SECRETARY - TREASURER _____

DATE _____ SUPERINTENDENT _____

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Replacement Allocations

Manitoba Education and Training has routinely provided a fixed level of funding, (pro-rated) based upon the type and number of facilities in schools. This support has traditionally been offered to assist schools with replacements, additions, upgrades, and major repairs, to equipment and furniture. Items, for which claims are submitted must be related to the program learning needs as required by the curriculum for Vocational Industrial, Industrial Arts, Home Economics, and/or Business Education. Claims will **not** be paid for items under $25.00 per unit. The total replacement allocation for a school division may be used in any proportions within the four facility types.

Claims for Replacement Allocations may be submitted to the Technology and Science Coordinator of the Curriculum Services Branch, who in turn will compile them for the Public Schools Finance Board to approve payment.

Capital Requests

Capital requests for renovations, expansions, or new establishments should be included in the five-year plans submitted annually to the Public Schools Finance Board. After a priorization process, school divisions will be notified about the budgets to be struck by the Board.

Regulations

The following regulations under the Act provide the basis for definitions and policies set out in this set of guidelines.

PART 4
TECHNOLOGY EDUCATION SUPPORT

Definitions
In this Part,

"approved" means approved by the minister for the purpose of determining support under clause 173(1.1)(a) of the Act;

"approved program" means an approved vocational program;

"Category I approved course" means a technology education course designated and approved as a Category I course;

"Category II approved course" means a technology education course designated and approved as a Category II course;

"eligible enrollment" means eligible enrollment as defined in section 171 of the Act and, in the case of pupils enrolled in technology education on a semestered basis who are not enrolled on September 30 of a fiscal year, means eligible enrollment as so defined but applying to pupils enrolled on February 28 of the fiscal year;

"technology education" means education provided in:
(a) a vocational industrial course
(b) an industrial arts course, or
(c) a home economics course;

"unit credit" means a Category I approved course or a Category II approved course consisting of between 110 and 120 hours of instruction in technology education;

"vocational program" means an approved series of courses consisting of 8 to 16 technology education courses intended to prepare a pupil for employment, and may include vocational industrial, industrial arts, home economics and business education courses in secondary grades.

Support for non-semestered technology education
The amount of support payable to a school division in each fiscal year for technology education offered on a non-semestered basis is the total of

(a) for each pupil in the eligible enrollment enrolled on September 30 of the fiscal year, $150. per pupil per unit-credit for a Category I approved course;
(b) for each pupil in the eligible enrollment enrolled on September 30 of the fiscal year, $50. per pupil per unit-credit for a Category II approved course; and
(c) $5000. for each approved program in the school division as at September 30 of the fiscal year.

Support for semestered technology education
The amount of support payable to a school division in each fiscal year for technology education offered on a semestered basis is the total of

(a) for each pupil in the eligible enrollment enrolled on September 30 of the fiscal year, $150. per pupil per unit-credit for a Category I approved course;
(b) for each pupil in the eligible enrollment enrolled on February 28 of the fiscal year, $150. per pupil per unit-credit for a Category I approved course;
(c) for each pupil in the eligible enrollment enrolled on September 30 of the fiscal year, $50. per pupil per unit-credit for a Category II approved course;
(d) for each pupil in the eligible enrollment enrolled on February 28 of the fiscal year, $50. per pupil per unit-credit for a Category II approved course; and
(e) $5000. for each approved program in the school division as at September 30 or February 28 of the fiscal year.

SECTION 4 ARTICULATION

There is an ongoing need to adjust the intent, content, and implementation of courses and programs to meet agreements of articulation with partners. Five specific partnerships are targeted for articulation arrangements.

Within schools

Within schools, the support for unit-credit titles is meant to encourage greater participation in Technology Education courses. For example, Science, Computer Studies, and Mathematics students should be given the opportunity to use such equipment as a "computer interface milling machine trainer" to observe and manipulate the software, ratios, 3-axis coordinates, and measurements in a practical sense. Some students may wish to elect a unit-credit experience in a Technology Education program, while others may prefer to experience a module transferable into their "academic" course. Conversely, the higher technology influences on all of the Technology Education programs indicate a growing need for students to participate in challenging Mathematics, Computer Studies, and Science courses. Appropriate language studies are necessary for success in the world of applied technologies.

Between schools

Between schools, students need less restrictive access to courses and programs. The unit-credits (equivalencies and/or transfers) are designed to provide limited vocational learning opportunities for rural, northern, small schools, and/or collegiates, where these opportunities did not exist before. Technology Education (Industrial Arts, Home Economics) may be taken at the home school, and credits transferred to another school having desired and articulated programs. These arrangements have been made available for local and regional decisions to be made. (Refer to the "UNIT-CREDIT TITLES UNDER PROGRAM HEADINGS, DIRECTORY.")

With colleges

With colleges, articulation agreements have been possible. Individual schools have made arrangements with individual colleges for the recognition of work completed on an advanced placement basis. There are ongoing efforts between the colleges and the Department of Education and Training to secure a provincial policy. This would provide equity for students throughout the province.

With the Apprenticeship Branch

With the Apprenticeship Branch there has been a long history of agreements. The need to have secondary graduates' competencies recognized for apprenticeship purposes, continues to be felt.

The articulation sought between secondary schools, colleges, and the Apprenticeship Branch is based upon three principles:

- common core curriculum accepted by all institutions;
- one sequence of delivery (irrespective of implementation modes);
- unchallenged transfer of student achievements/competencies to be granted.

There are ongoing deliberations between the Department of Labour, the Department of Education and Training, and the schools, in the attempt to formalize the articulation agreements.

With the Workplace

With the workplace, agreements are generally at the school level. The advisory board/committee system to provide advice to schools for vocational programs, is an excellent opportunity for articulating with the private sector. Work Education is the most important component of a vocational program for promoting the transition to work for each student. Schools are encouraged to form partnerships with the private sector for not only student placement purposes, but also for teacher professional development regarding trends and processes in the workplace. (For more information about Work Education, consult the "WORK EDUCATION GUIDELINES, 1991" available from the Technology [Vocational] consultant.)

SECTION 5 PROGRAMS

Programs are a collection of unit-credits that serve to prepare students for a vocational or occupational opportunity upon graduation. (For vocational programs to have the support of funding, they must meet the criteria outlined under Section 3, Program Support, Categorial Grant, p.7.)

Programs are approved by the Assistant Deputy Minister, Program Development and Support Services Division, Manitoba Education and Training. If facilities are in need of alteration, or establishment, coincidental to the program being approved, the approval process needs to be coordinated with division requests of the Public Schools Finance Board.

Approval Process

To have a vocational program accepted for approval, the criteria (Section 3, Program Support, Categorial Grant, p.7.) becomes the guideline for such a request.

Consultant services are available from the Technology and Sciences Team, Curriculum Services Branch, to assist divisions in planning the request, and to help coordinate the approvals in conjunction with the Public Schools Finance Board. **Consultant services are not to be construed as approvals.**

The following process is a tool which may be used in rationalizing a proposal:

1. **Assessment of Local Needs**

    a) obtain advisory committee input,
    b) estimate the community acceptance for the proposal,
    c) determine the effect of the proposal on existing offerings and programs,
    d) describe the congruence of the proposal with student aptitudes and abilities,
    e) identify the spin-off occupations.

2. **Assessment of Local Resources**

   a) identify the staff to be designated and discuss their expertise or credentials,
   b) estimate the program operational costs and revenues,
   c) describe the work education component,
   d) assess the timetabling required to implement the proposed program,
   e) describe the physical facilities to be used, altered, or added,
   f) identify and describe the potential job market for graduates (if applicable).

3. **Enrollment Patterns**

   a) outline a five-year history of enrollment patterns for the school,
   b) outline a five-year projection of enrollment patterns for the school and for the proposed program.

4. **Facilities Requirements**

   a) prepare a rough sketch floor-plan for existing space,
   b) prepare a rough sketch floor plan for space required (altered or added),
   c) prepare a list of equipment (with estimated prices) for the program requirements.

The need to maintain a well balanced offering within a school is recognized. The aesthetics, classical studies, and personal-choice options are important in a well-rounded education. **As a guideline**, the following formula will be used in determining the number of vocational programs which may be approved in any one school. This formula is based upon the history of comprehensive education since 1974:

$$\frac{\text{no. of students S1 to S4}}{100} = \text{maximum no. of programs}$$

Closures and Alterations Process

In the event that a school division wishes to close or alter a program and/or its facilities, Manitoba Education and Training **recommends** that the school division seek the services of curriculum services consultants in making this decision.

The following process is recommended:

1. rationale for the program alteration or closure should be provided, complete with a full description of the history of events leading up to this decision,
2. enrollment data should be provided over the past five years of program offering,
3. perceived changes to the job-market feasibility should be described (if applicable),
4. effects upon teacher assignment(s) should be described,
5. proposed use of or need for space should be described,
6. complete inventory of assets (equipment and furniture) should be provided, showing the estimated condition of each piece of equipment and furniture.

If alterations to facilities are recommened, the required program approval process must coincide with the Public Schools Finance Board approval for necessary capital requirements. (The Coordinator, Technology and Science, will assist both the school division or district, and the Public Schools Finance Board in this approval process.) Where a program closure is recommended, the replacement allocations assigned to that program will be removed.

Any changes to the blend of unit-credit titles to be used in a program, requires approval from the Department, so that program categorial grants can flow uninterrupted to the division.

Unit-Credits for Programs

Schools are encouraged to review their programs from time to time, and to explore ways to keep them current. The first considerations to be embraced would best include: reviewing of the unit-credits being used within the program; planning for expenditures; using replacement allocations efficiently; obtaining the advice of the advisory system; changing methodology or implementation modes; requesting assistance from Department Consultants; forming partnerships; and/or keeping current with the literature.

It is left to schools to assess existing resources (facilities, staff, and approved curriculum at hand) as variables to be used in making adjustments to programs. With the unit-credit concept in place (and the funding in support of unit-credits), schools may prefer to use a wider variety of courses in order to tailor programs to individual students. "Programs" may be formed by blending unit-credits from a variety of Vocational Industrial/Industrial Arts/Home Economics/Business Education unit-credits.

Work Education experiences are **alternative delivery systems** for providing approved curriculum to students. It is left to schools to arrange and provide the nature and extent of work education that best serves the school, the program, the private sector partner, and the student.

SECTION 6: RELATED ACADEMICS

The **Vocational Education Program Model** is an alternative route to obtaining a high school graduation diploma. **It is not the required model for students who wish to take Technology Education unit-credits, or a vocational program.** If a student does not relate to the core requirements of the regular High School Program model, the core requirements of the Vocational Education Program Model may be relevant for such students.

Any student may wish to study in a vocational program at the Senior 3 and 4 levels, in depth. This may require that the students elect the Vocational Education Program Model rather than the regular High School Program Model. If a student wants to pursue an indentured trade, it may be that the Vocational Education Program Model is the best alternative.

The core requirements (Mathematics, Science, and Language Arts) at the Senior 3 and 4 levels of the Vocational Education Program Model, should be selected at the level best suited to the students' abilities. **Vocational program students may take their core requirements at the General (G), Specialized (S), Modified (M), Advanced (A), or Applied (V) levels.** Very **few** students in the Vocational Education Program Model should be encouraged to elect their core at the Modified (M) or Applied (V) level...most students have traditionally functioned at the General (G), or Specialized (S) level of core.

The related academics, or Applied (V) core courses are designed specifically to apply to Vocational Education programs.

1. Applied (V) core courses are for Language Arts (Senior 3 and 4, 1 credit each), Mathematics (Senior 3), and Science (Senior 3).
2. Applied (V) core courses are vocational applications of the core discipline. Applied (V) core courses are in the order of implementation strategies with vocational relevance.
3. Applied (V) core courses are considered "vocational" in nature, and therefore may be taught in one of three ways:

    - in a segregated classroom. (This is most likely in a large school where the enrollments would warrant large enough groupings);

- integrated in the General (G) classes. (The teacher would be required to provide the student with special application exercises);
- integrated into the vocational program by the Vocational Education teacher. (The teacher would be required to set the special exercises to meet the core requirements and applications, and keep track of the time as apart from the vocational skills studies).

SECTION 7 INTEGRATED CONCEPTS

Throughout **any** Vocational Education Program, or **any** Technology Education unit-credit, several concepts should be part of the implementation strategies. The way by which each of the following concepts are to be integrated depends upon the circumstances (opportunities, teacher preference, resources at hand) at each local school. The following concepts are considered important, and should be part of each program, or course:

Employability Skills

Advisory committees to education at all levels, report on the need to have students increase their academic, personal management, and teamwork skills. The Conference Board of Canada has recently released the following:

> *Employability skills are the generic skills, attitudes and behaviours that employers look for in new recruits and that they develop through training programs for current employees. In the workplace, as in school, the skills are integrated and used in varying combinations, depending on the nature of the particular job activities.*
>
> *The Council recognizes the need for employers to accommodate individual differences and to provide equal opportunities for women, native people, visible minorities and people with disabilities.*
>
> *Employability skills are developed in school and through a variety of life experiences outside school. The student, the family and the education system, supported and enhanced by the rest of society, share this responsibility.*
>
> *All the skills listed in this profile are already either explicit or implicit in general educational goal statements of the provinces and territories. Drawing attention to skills necessary for employability is compatible with and can enhance a school's efforts to meet its other goals and objectives.*

ACADEMIC SKILLS: *Those skills which provide the basic foundation to get, keep and progress on a job and to achieve the best results.*

Canadian employers need a person who can:

Communicate

- *Understand and speak the languages in which business is conducted.*
- *Listen to understand and learn.*
- *Read, comprehend and use written materials, including graphs, charts and displays.*
- *Write effectively in the languages in which business is conducted.*

Think

- *Think critically and act logically to evaluate situations, solve problems and make decisions.*
- *Understand and solve problems involving mathematics and use the results.*
- *Use technology, instruments, tools and information systems effectively.*
- *Access and apply specialized knowledge from various fields (e.g., skilled trades, technology, physical sciences, arts and social sciences).*

Learn

- *Continue to learn for life.*

PERSONAL MANAGEMENT SKILLS: *The combination of skills, attitudes and behaviours required to get, keep and progress on a job and to achieve the best results.*

Canadian employers need a person who can demonstrate:

Positive Attitudes and Behaviours

- *Self-esteem and confidence.*
- *Honesty, integrity and personal ethics.*
- *A positive attitude toward learning, growth and personal health.*
- *Initiative, energy and persistence to get the job done.*

Responsibility

- *The ability to set goals and priorities in work and personal life.*
- *The ability to plan and manage time, money and other resources to achieve goals.*
- *Accountability for actions taken.*

Adaptability

- *A positive attitude toward change.*
- *Recognition of and respect for people's diversity and individual differences.*
- *The ability to identify and suggest new ideas to get the job done-creativity.*

TEAMWORK SKILLS: *Those skills needed to work with others on a job and to achieve the best results.*

Work With Others

Canadian employers need a person who can:

- *Understand and contribute to the organization's goals.*
- *Understand and work within the culture of the group.*
- *Plan and make decisions with others and support the outcomes.*
- *Respect the thoughts and opinions of others in the group.*
- *Exercise "give and take" to achieve group results.*
- *Seek a team approach as appropriate.*
- *Lead when appropriate, mobilizing the group for high performance.*

The following are "foundation" skills, and are important for the process of learning as well as for working.

BASIC SKILLS: *Reads, writes, performs arithmetic and mathematical operations, listens, and speaks*

A. ***Reading*** *- locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.*

B. ***Writing*** *- communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.*

C. ***Arithmetic/Mathematics*** *- performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.*

D. ***Listening*** *- receives, attends to, interprets, and responds to verbal messages and other cues.*

E. ***Speaking*** *- organizes ideas and communicates orally.*

THINKING SKILLS: *Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn and reasons.*

A. ***Creative Thinking*** *- generates new ideas.*

B. ***Decision Making*** *- specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.*

C. ***Problem Solving*** *- recognizes problems and devises and implements plan of action.*

D. ***Seeing Things in the Mind's Eye*** *- organizes, and processes symbols, pictures, graphs, objects and other information.*

E. ***Knowing How to Learn*** *- uses efficient learning techniques to acquire and apply new knowledge and skills.*

F. ***Reasoning*** *- discovers a rule or principle underlying the relationship between two or more objects and applies it in solving a problem.*

PERSONAL QUALITIES: *Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.*

A. ***Responsibility*** *- exerts a high level of effort and perseveres towards goal attainment.*

B. ***Self-Esteem*** *- believes in own self-worth and maintains a positive view of self.*

C. ***Sociability*** *- demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings.*

D. ***Self Management*** *- assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.*

E. ***Integrity/Honesty*** *- chooses ethical courses of action.*

Sustainable Development

As outlined in "Towards a Sustainable Development Strategy for Manitobans" (from the Manitoba Round Table on Environment and Economy), the principles of sustainable development include:

- integration of environmental and economic decisions;
- stewardship (management);
- shared responsibility;
- prevention of adverse influences;
- conservation;
- recycling;
- enhancement of long-term planning for productivity;
- rehabilitation and reclamation;
- scientific and technological innovation;
- global responsibility.

Fundamental guidelines from the "Round Table" are indications about how the vision for sustainable development may be achieved:

- efficient use of resources;
- public participation;
- understanding and respect;
- access to adequate information;
- integrated decision-making and planning;
- substitution (for scarce resources).

  Resources: Identifies, organizes, plans, and allocates resources:

  - **Time** - Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules;
  - **Money** - Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives;
  - **Material and Facilities** - Acquires, stores, allocates, and uses materials or space efficiently;
  - **Human Resources** - Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

Entrepreneurship

Entrepreneurship is **more** than starting a business. It is the use of innovative problem solving skills to go about any venture in personal and employment life. Entrepreneurship is the ability to use resources in creative ways, to gain desired outcomes with the least amount of risk.

The creative, brainstorming, innovative, and idea-generating process is the target for all entrepreneurial studies and school-based activities. **The entrepreneurship phenomenon should serve all students.** The enthusiasm for encouraging stronger science and mathematics studies is both reflected in and related to this concept of entrepreneurism with creative problem solving potential.

The movement towards entrepreneurism is clearly related to awakening interest in: **networking; cooperative learning; mastery learning; applied sciences, mathematics, and language arts; skills development; life skills; work education; individualization; problem solving; decision making; student-centred learning; special needs facilitation; opportunities for women;** and the **transition to work. Entrepreneurship is central to these issues.**

Technology

The use of the computer brings to Technology Education the dimensions of speed, accuracy, manipulation, and applications of the technology that continue to grow.

Computer applications to accounting, word processing, keyboarding, data-base management, spreadsheets, desk-top publishing and special applications (e.g.: CAD-CAM; Computer Numeric Controls; Computer Interfacing; Robotics; Computer controlled hydraulics and pneumatics; Automotive Electronics) **have increased** significantly over the past few years.

The shift from "programming" to "applications" is the **most appropriate shift for most** secondary level students. **The mandate** for computer languages to be mastered, and programming to be emphasized, rests with post-secondary education and training. (The K-12 school system has a mandate to focus upon introductory computer sciences, and applications.) Our contacts with industry indicate a need for programs with an emphasis upon "troubleshooting" when applications present difficulties.

Replacement allocations should find their way to computer interfaces with trainers for a wide range of vocational applications. Trainers meet the generic needs of secondary programs. (Production equipment is best left to industry as a productive element, only to be used by students on a work education agreement). For example, AUTOTRONICS (the electronic diagnostic science being developed by the auto manufacturers) is a trainer/simulator approach to teaching automotive technicians their craft at the secondary and post-secondary (as well as dealership) level.

Special Needs Programming

Technology Education offers the best of all opportunities to all students. The relevance of "hands-on" applications is highly motivational. The range of skills found in the workplace can be replicated in the shop. The academic rigor of learning exercises may be adjusted by the software/tasks/expected outcomes of the learning system.

Under special circumstances, and with special planning, Individual Education Plans (IEP's) can be developed. If necessary for reasons of time and safety, a teaching assistant/resource staff person may be required.

For special needs programming, each vocational/technology shop should be regarded as a **resource area** where students could attend, on a priorized basis, to supplement their learning. For example, the following situations are possible:

- science students using computer-interfaced trainers to study scientific phenomenon;
- math students using computer-interfaced trainers to study the coordinates of 3-dimensional mechanical movement;
- computer programming students using computer-interfaced trainers to witness the effects of the programs;
- drafting students manipulating their design through CAD;
- special needs students using the shop area to study gradation, such as the relative size of wrenches;
- Language Arts students using computer-interfaced video to manipulate expression through language, music, or movement.

The vocational/technology program areas of **any** school provide the opportunity for individual students' needs to be met.

SECTION 8 BACKGROUND

The following documents are important resources for TECHNOLOGY EDUCATION.

Answering the Challenge - Strategies for Success in Manitoba High Schools, Manitoba Education and Training, 1990.

Building a Solid Foundation for Our Future - A Strategic Plan, Manitoba Education and Training, 1991.

Creating a Framework for the Future - Education Legislation for the 1990's, Manitoba Education and Training, 1991.

Directory of Schools Offering Technology Education, Technology and Science Unit, Curriculum Services Branch, 1992.

Implementation of the High School Review - A Resource for Administrators and Teachers, Manitoba Education and Training, 1992.

A Lot to Learn - Education and Training in Canada, a statement by the Economic Council of Canada, 1992.

Partners in Skills Development - The Report of the Skills Training Advisory Committee, Manitoba Education and Training, 1990.

Towards a Sustainable Development Strategy for Manitobans, Sustainable Development Coordinator Unit, 1990.

Unit-Credit Titles Under Program Headings, Directory, Technology and Science Unit, Curriculum Services Branch, 1992.

Work Education Guidelines, Manitoba Education and Training, 1991.